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C. E. HOOVER

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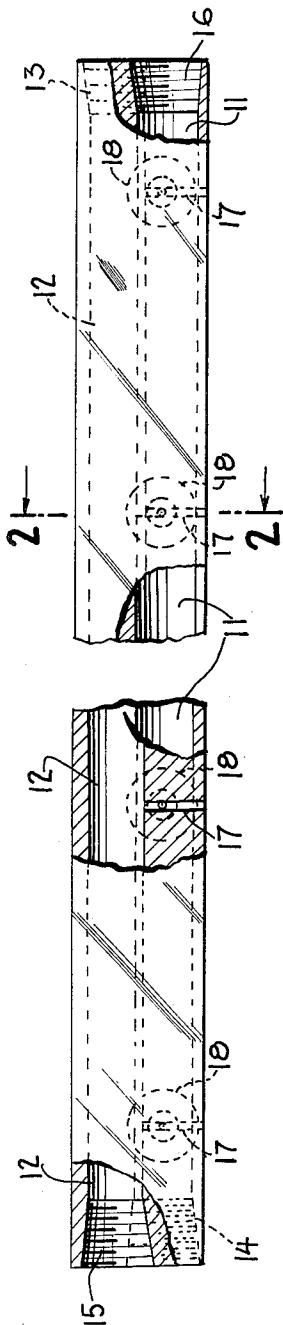


Fig. 1

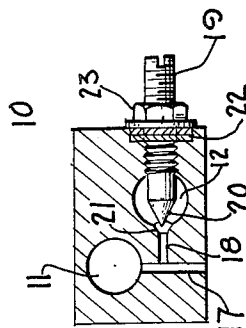


Fig. 2

INVENTOR.
CLINTON E. HOOVER

BY

Pollard Johnston Smyth & Robertson
ATTORNEYS

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NOZZLE

Clinton E. Hoover, East Moline, Ill., assignor to American Machine and Metals, Inc., New York, N.Y., a corporation of Delaware

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This invention relates to atomizing apparatus, and particularly to a new and improved unitary atomizer for producing a mass of finely divided water particles moving at a high velocity.

In many industrial processes it is often desirable to employ a mass of finely divided water particles moving at a high velocity in order to accomplish a desired result. Only by way of example, such high velocity masses are useful in cleaning processes where abrasion cannot be tolerated. Also, in certain heat treating processes, optimum quenching action can be attained if the quenching liquid is applied in the form of a very high velocity mass of finely divided water particles.

An important object of this invention is to provide an atomizing device that is simple to make, rugged in construction and capable of breaking water droplets into very fine water particles and imparting to them a very high velocity.

Another object of this invention is to provide a unitary device capable of breaking water droplets into very fine particles and imparting to them a high velocity.

Another object of this invention is to provide such a device that can be made out of bar stock and the like.

Another object of this invention is to provide such an atomizing device in which a shearing action of liquid droplets occurs internally of the device.

Still another object of this invention is to provide such a device having a reduced tendency to plugging.

In one aspect of the invention, a piece of bar stock or the like may have longitudinally extending, parallel, spaced passages at different elevations extending therethrough. Right angular jet passages may extend from each of the parallel passages in a manner to intersect each other.

In another aspect of the invention, adjustable valve means may cooperate with the jet passages leading from one of the parallel passages for controlling the flow of a liquid therethrough. Air under pressure may be supplied to the other parallel passage.

The construction and arrangement of the passages are such that liquid is forced at right angles, in small droplet quantities, into a high velocity air stream within the device. This causes the breaking up of the liquid droplets into very fine liquid particles which are subjected to the high velocity of the air stream.

The above, other objects and novel features of the new and improved atomizing device will become apparent from the following specification and accompanying drawing which is merely exemplary.

In the drawing:

FIG. 1 is an elevational view of an atomizing manifold to which the principles of the invention have been applied; and

FIG. 2 is a sectional elevational view taken substantially along line 2-2 of FIG. 1.

Referring to the drawings, a piece of bar stock 10 may have two parallel spaced passages 11 and 12 drilled therethrough. The passages 11 and 12 may be at different elevations for a purpose to be described. Plugs 13 and 14 may be employed to block the one end of each of the passages 11 and 12. Threaded openings 15 and 16 may be provided at the other ends of the passages 11 and 12 for

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the reception of lines supplying air to passage 11 and water to passage 12.

Referring to FIG. 2, relatively small passages 17 may be drilled through one side of the manifold 10, leading from the passage 11 to atmosphere. There may be any number of these passages 17 spaced along the manifold 10 depending upon the use to which the atomizer is put.

A corresponding, relatively small passage 18 may be drilled transversely through the manifold 10 for each of the passages 17 and in a manner to provide communication between the passage 12 and each of the passages 17. The passages 18 are preferably at right angles to the passages 17. Each of the passages 18 may be counterbored and threaded to receive an adjusting screw 19 having a conical end 20, for cooperation with a seat 21 formed at the juncture of passages 18 and passage 12. Sealing washers 22 may be employed to prevent leakage around the screw 19, and a lock nut 23 may be employed to lock the screw 19 in adjusted position.

With air under a predetermined pressure supplied to passage 11, high velocity jets of air issue from the exhaust end of passages 17. Upon supplying a liquid such as water to the passage 12 under a predetermined pressure, it can be theorized that a continuous supply of droplets of water having substantially the diameter of passages 17 as subjected to a shearing action of the high velocity jets of air within passages 17. This action is believed to break up the water droplets into very fine particles of water due to the shearing action of the air jet in passages 17. Additionally, these small particles of water have imparted to them a velocity substantially equal to that of the jet of air within the passages 17, resulting in a mass of finely divided particles of water having a high velocity issuing from the atomizing manifold 10.

From an inspection of the drawing, it is apparent that the shearing action of the droplets of water occurs internally of the manifold 10 which reduces the possibility of plugging of the passages 17 and 18 which often occurs with prior known devices in which a jet of air acts on a jet of liquid externally of the atomizer, due to foreign matter in the surrounding atmosphere.

Although the various features of the new and improved unitary atomizing device have been shown and described to fully disclose one embodiment of the invention, it will be evident that numerous changes may be made in such details and certain features may be used without others without departing from the principles of the invention.

What is claimed is:

1. In an atomizing device, an elongated piece of bar stock; longitudinal main passages extending completely through said bar stock, the longitudinal axes of which are parallel to, spaced from each other and located within a plane extending longitudinally through said bar stock and diagonally disposed relatively to the longitudinal centerline of said bar stock; a plurality of substantially equally spaced small diameter passages extending from one of said main passages and lying within a single plane passing through the longitudinal axis of said main passage; another small diameter passage intersecting each of said first mentioned small diameter passages wholly within the cross sectional confines of said piece of bar stock, extending from the other of said main passages and lying within a plane passing through the longitudinal axis of said other main passage and at right angles to the plane including said first mentioned small diameter passages; a separate adjustable needle valve extending into said other main passage for each of said other small diameter passages and in alignment therewith; means for locking said needle valve in adjusted position; and sealing means cooperable with said locking means for preventing leakage around said needle valve.

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2. In an atomizing device, an elongated piece of bar stock; longitudinal main passages extending completely through said bar stock, the longitudinal axes of which are parallel to, spaced from each other and located within a plane extending longitudinally through said bar stock and diagonally disposed relatively to the longitudinal centerline of said bar stock; means for closing one end of each main passage at opposite ends of said bar stock; a plurality of substantially equally spaced small diameter passages extending from one of said main passages and lying within a single plane passing through the longitudinal axis of said main passage; another small diameter passage intersecting each of said first mentioned small diameter passages wholly within the cross sectional confines of said piece of bar stock, extending from the other of said main passages and lying within a plane passing through the longitudinal axis of said other main passage and at right angles to the

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plane including said first mentioned small diameter passages; a separate adjustable needle valve extending into said other main passage for each of said other small diameter passages and in alignment therewith; means for locking said needle valve in adjusted position; and sealing means cooperable with said locking means for preventing leakage around said needle valve.

References Cited in the file of this patent

UNITED STATES PATENTS

1,149,932	McKaig	Aug. 10, 1915
1,587,736	Schenck	June 8, 1926
2,884,205	Van Buren	Apr. 28, 1959

FOREIGN PATENTS

25,420	Germany	Jan. 4, 1884
605,659	Germany	Nov. 15, 1934